

display is released when the acceleration is between a_{min} and a_{max} for a certain amount of time.

The use of a predetermined maximum acceleration limit a_{max} in addition to the predetermined minimum acceleration limit a_{min} establishes an acceleration range in which the absolute value of the acceleration is considered unusual and a close signal should be generated when the acceleration is within the band for a predetermined time or number of intervals. The use of a predetermined maximum acceleration limit a_{max} prevents generation of the close signal and closing the flexible display device when the flexible display device is jarred or bumped, but not dropped. The range between a_{min} and a_{max} can be selected to allow for the acceleration sensor accuracy, i.e., to be sure the range is larger than the inaccuracy of the acceleration sensor. The predetermined maximum acceleration limit a_{max} can act by inhibiting the release of the flexible display device from the open position when the acceleration exceeds the predetermined maximum acceleration limit a_{max} .

While the embodiments of the invention disclosed herein are presently considered to be preferred, various changes and modifications can be made without departing from the scope of the invention. The scope of the invention is indicated in the appended claims, and all changes that come within the meaning and range of equivalents are intended to be embraced therein. The specification and drawings are accordingly to be regarded in an illustrative manner and are not intended to limit the scope of the appended claims.

In interpreting the appended claims, it should be understood that:

- a) the word "comprising" does not exclude the presence of other elements or acts than those listed in a given claim;
- b) the word "a" or "an" preceding an element does not exclude the presence of a plurality of such elements;
- c) any reference signs in the claims do not limit their scope;
- d) several "means" may be represented by the same item or hardware or software implemented structure or function;
- e) any of the disclosed elements may be comprised of hardware portions (e.g., including discrete and integrated electronic circuitry), software portions (e.g., computer programming), and any combination thereof;
- f) hardware portions may be comprised of one or both of analog and digital portions;
- g) any of the disclosed devices or portions thereof may be combined together or separated into further portions unless specifically stated otherwise; and
- h) no specific sequence of acts is intended to be required unless specifically indicated.

The invention claimed is:

1. A flexible display device comprising:
a flexible display;
a spreader mechanism operably connected to the flexible display, the spreader mechanism having a latch assembly to maintain the spreader mechanism in an open position;
an acceleration sensor generating an acceleration signal;
and
an acceleration processor responsive to the acceleration signal and generating a close signal when the acceleration signal exceeds a predetermined acceleration limit;
wherein the latch assembly is responsive to the close signal to release the spreader mechanism from the open position, wherein the acceleration processor is configured to generate the close signal when the device is dropped.

2. The device of claim 1 wherein the flexible display is under tension to urge the spreader mechanism toward a closed position.

3. The device of claim 1 wherein the latch assembly is passive.

4. The device of claim 1 wherein the latch assembly comprises: a spreader lever operably connected to the spreader mechanism; a magnet having a magnetic field, the magnet being disposed to attract the spreader lever and latch the spreader mechanism in the open position; a coil operable to receive the close signal, the coil generating a coil magnetic field in response to the close signal; wherein the coil magnetic field offsets the magnet magnetic field to release the spreader lever from the magnet when the coil receives the close signal.

5. The device of claim 4 wherein the spreader lever is manually operable to release the spreader mechanism from the open position.

6. The device of claim 1 wherein the latch assembly comprises:

- a spreader lever operably connected to the spreader mechanism;
- a transmission lever operable to engage the spreader lever in a latched position;
- a solenoid having a solenoid coil and a solenoid plunger, the solenoid coil being operable to move the solenoid plunger in response to the close signal;
- wherein the solenoid plunger moves the transmission lever from the latched position to release the spreader lever from the transmission lever when the solenoid coil receives the close signal.

7. The device of claim 6 further comprising a spring biasing the transmission lever toward the latched position.

8. The device of claim 6 wherein the spreader lever is manually operable to release the spreader mechanism from the open position.

9. The device of claim 1 further comprising a switch operably connected to provide the close signal to the latch assembly in response to pushing the switch.

10. A method for auto-closing a flexible display device having an open position and a closed position comprising:
measuring acceleration of the flexible display device;
determining when the flexible display device is dropped by determining whether the acceleration exceeds a predetermined minimum acceleration limit; and
releasing the flexible display device from the open position when the flexible display device is dropped.

11. The method of claim 10 further comprising: determining whether the acceleration exceeds a predetermined maximum acceleration limit; and inhibiting the releasing the flexible display device from the open position when the acceleration exceeds the predetermined maximum acceleration limit.

12. The method of claim 10 wherein the measuring acceleration comprises measuring acceleration at intervals and the determining comprises determining whether the acceleration exceeds a predetermined minimum acceleration limit for a predetermined number of the intervals.

13. The method of claim 10 wherein the measuring acceleration comprises measuring acceleration of the flexible display device when the flexible display device is not in the closed position.

14. The method of claim 10 wherein the releasing comprises determining whether the flexible display device is in the open position and releasing the flexible display device from the open position when the acceleration exceeds the predetermined minimum acceleration limit and the flexible display device is in the open position.